

That which is claimed is:

1. A process for recovery of acid values from a gaseous mixture formed by catalytic oxidation of propylene with a gaseous source of dioxygen which process comprises:

5 quenching the gaseous mixture comprising acid values of acrylic acid and acetic acid, steam and one or more non-condensable gas with an aqueous quench liquid to form an aqueous solution comprising acid values;

10 contacting the aqueous solution with an immiscible solvent comprising propyl acetate and a cyclohexane to form an organic extract comprising acid values and a major portion of the propyl acetate, and an aqueous raffinate comprising a minor portion of the propyl acetate;

15 fractionating the organic extract as by distillation to obtain a high boiling fraction substantially free of cyclohexane and a low boiling fraction comprising cyclohexane and steam; and

thereafter fractionating the high boiling fraction to obtain an acrylic acid product substantially free of propyl acetate and a propyl acetate fraction comprising propyl acetate and acetic acid.

20 2. The process according to claim 1 wherein the immiscible solvent comprises isopropyl acetate and no less than about 25 percent of cyclohexane based upon the total weight of isopropyl acetate and cyclohexane.

25 3. The process according to claim 1 wherein the immiscible solvent comprises isopropyl acetate and from about 30 to about 80 percent of cyclohexane based upon the total weight of isopropyl acetate and cyclohexane.

30 4. The process according to claim 1 wherein the contacting is carried out using a continuous extraction system with counter-current flow of the aqueous solution and the immiscible solvent.

5. The process according to claim 1 wherein the aqueous solution comprises from about 30 to about 70 percent of acrylic acid, from about 0.5 to about 7.5 percent of acetic acid and from

about 15 to about 65 percent of water based upon the weight of the aqueous solution.

5 6. The process according to claim 1 wherein the high boiling fraction contains less than 10 percent by weight of cyclohexane.

10 7. The process according to claim 1 which further comprises condensing at least a portion of the low boiling fraction thereby forming condensate comprising immiscible aqueous and cyclohexane phases, and separating a recovered cyclohexane phase from the aqueous phase.

8. The process according to claim 1 wherein the acrylic acid product contains less than 0.1 percent by weight of acetic acid.

15 9. The process according to claim 1 wherein the propyl acetate fraction comprises from about 80 to about 93 percent of propyl acetate and from about 2 to about 15 percent of acetic acid based upon the weight of the propyl acetate fraction.

20 10. The process according to claim 1 wherein at least 90 percent of the acrylic acid contained in the aqueous solution is recovered in the acrylic acid product.

11. A process for recovery of acid values from a gaseous mixture formed by catalytic oxidation of propylene with a gaseous source of dioxygen which process comprises:

25 quenching the gaseous mixture comprising acid values of acrylic acid and acetic acid, steam and one or more non-condensable gas with an aqueous quench liquid to form an aqueous solution comprising acid values;

30 contacting the aqueous solution with an immiscible solvent comprising propyl acetate and a cyclohexane to form an organic extract comprising acid values and a major portion of the propyl acetate, and an aqueous raffinate comprising a minor portion of the propyl acetate;

fractionating the organic extract as by distillation to obtain a high boiling fraction substantially free of cyclohexane and a low boiling fraction comprising cyclohexane and steam;

5 fractionating the high boiling fraction to obtain an acrylic acid product substantially free of propyl acetate and a propyl acetate fraction comprising propyl acetate and acetic acid; and

fractionating the propyl acetate fraction to obtain an acetic acid product substantially free of propyl acetate and a recovered propyl acetate fraction.

10 12. The process according to claim 11 wherein the immiscible solvent contains at least a portion of the recovered propyl acetate fraction.

15 13. The process according to claim 11 which further comprises condensing at least a portion of the low boiling fraction thereby forming condensate comprising immiscible aqueous and cyclohexane phases, and separating a recovered cyclohexane phase from the aqueous phase, and wherein the immiscible solvent contains at least a portion of the recovered cyclohexane.

20 14. The process according to claim 13 which further comprises forming a stripping tower feed by combining at least a portion of the separated aqueous phase with at least a portion of the aqueous raffinate, and contacting the stripping tower feed with steam to recover solvents and obtain wastewater suitable for bio-treatment.

25 15. A process for recovery of acid values from a gaseous mixture formed by catalytic oxidation of propylene with a gaseous source of dioxygen which process comprises:

30 quenching the gaseous mixture comprising acid values of acrylic acid and acetic acid, steam and one or more non-condensable gas with an aqueous quench liquid to form an aqueous solution comprising acid values;

contacting at least a portion of the aqueous solution with an immiscible solvent comprising propyl acetate and a cyclohexane to form an organic extract comprising acid values and a major

portion of the propyl acetate, and an aqueous raffinate comprising a minor portion of the propyl acetate;

fractionating at least a portion of the organic extract as by distillation to obtain a high boiling fraction substantially free of
5 cyclohexane and a low boiling fraction comprising cyclohexane and steam;

condensing at least a portion of the low boiling fraction to form a mixture of at least two immiscible liquid phases, and separating from the mixture a recovered cyclohexane phase
10 containing less than about 2 percent by weight of water;

fractionating the high boiling fraction to obtain an acrylic acid product substantially free of propyl acetate and a propyl acetate fraction comprising propyl acetate and acetic acid; and

fractionating the propyl acetate fraction to obtain an acetic
15 acid product substantially free of propyl acetate and a recovered propyl acetate fraction.

16. The process according to claim 15 wherein the immiscible solvent contains at least a portion of the recovered cyclohexane phase.

20 17. The process according to claim 15 wherein the immiscible solvent contains at least a portion of the recovered propyl acetate fraction and at least a portion of the recovered cyclohexane phase.

25 18. The process according to claim 15 wherein the fractionating of the organic extract is carried out in a continuous distillation system using as reflux at least a portion of the recovered cyclohexane.

30 19. The process according to claim 15 wherein the immiscible solvent, comprising propyl acetate and a cyclohexane, contains less than a total of about 2 percent by weight of acrylic acid and acetic acid.

20. The process according to claim 15 wherein more than 90 percent of the acrylic acid contained in the aqueous solution is recovered in the acrylic acid product.